

REMARKS

Claims 1, 7-13 and 15-20 are pending in the application. Claims 1, 7-13 and 15-20 are rejected. Claim 1 has been canceled. Claims 7-13, 15, 17 and 19 have been amended. New claims 21-25 have been added. No new matter is submitted with these amendments.

Reply to the Rejection of Claim 1 under 35 U.S.C. § 112, second paragraph

The Examiner has rejected Claim 1 as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Specifically, the Examiner states –

Claim 1 discloses a graft polymer comprising a backbone moiety and at least one moiety grafted onto the backbone moiety, wherein: (A) said backbone and grafted moieties comprise a hydrophobe and an amine or amide, wherein: (B) said backbone is selected from the groups consisting of a natural polymer, a non-polymer, and homopolymers and copolymers formed from monomers selected from the group consisting of (meth)acrylates, maleates, (meth)acrylamides, vinyl esters, itaconates, styrenes, unsaturated hydrocarbons, acrylonitrile, nitrogen functional monomers, vinyl esters, alcohol functional monomers, glycols, epoxides, and unsaturated hydrocarbons. There are two different statements (A) and (B) for the definitions of backbone polymer in the same claim. A backbone polymer in the second statement is selected from the ingredients recited under Markush groups. For example, the selected unsaturated hydrocarbons or the alcohol functional monomers have no hydrophobe moiety, nor an amine or amide moiety for producing a backbone polymer. It is not clear how a selected non-polymer should have an amine or amide moiety. The unsaturated hydrocarbons are cited twice in claim 1. The definitions for hydrophobic and hydrophilic monomers are given at column 4 in the Patent 6,262,152, see discussed below.

Claim 1 has been canceled. New independent claim 21 has been added. It is believed that this amendment overcomes the rejection of Claim 1 as being indefinite under 35 U.S.C. § 112, second paragraph. Withdrawal of the rejection is respectfully requested.

Reply to the Rejection of Claims 1, 7-13 and 15-20 under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1, 7-13 and 15-20 as being unpatentable over U.S. Patent No. 4,960,465 to Arfaei ("Arfaei"). Specifically, the Examiner states –

Claim 1 discloses a graft polymer comprising a backbone moiety and at least one moiety grafted onto the backbone moiety, wherein said backbone and grafted moieties comprise a hydrophobe and an amine or amide.

Arfaei discloses a graft copolymer comprising a backbone polymer and side chain polymers which are attached to said backbone polymer at various points, column 1, lines 48-51. A backbone polymer is a polyether such as a polyoxypropylene homopolymer or oxypropylene/oxyethylene copolymer, column 2, lines 45-46. The polyethers may include reactive groups such as an amino group, column 2, line 53. The backbone polymer based on polyoxypropylene homopolymer or oxypropylene/oxyethylene copolymer having amino functional groups is applicants' claimed hydrophobic backbone polymer. The side chain polymers which are grafted onto a polyether can be produced by polymerizing ethylenically unsaturated monomers, column 3, lines 45-51. A monomer such as diethylaminoethyl methacrylate, column 4, line 17 can be selected such as a hydrophobic monomer having an amino moiety in the molecule, for applicants' claimed grafted moiety comprising a hydrophobe and an amine as specified in the present example 1 at page 7. The graft copolymer functions as a plasticizer in the cement composition, abstract. The hydraulic cement is a substrate for the present claim 16, column 6, lines 60-68. It would have been obvious to one of ordinary skill in the art to use a graft copolymer in Arfaei wherein the backbone polymer and a side chain grafted polymer can be selected for being a hydrophobic polymer having an amine moiety for each formulation of a backbone polymer and a side chain polymer since in the reference variety of polyethers backbone and ethylenically unsaturated monomers work equally well within the same desired expectation.

. . . . The applicants amend claim 1 by including the definitions for backbone polymer. In light of the unclear definition of the backbone polymer that was discussed in the paragraph 1 above, the backbone polymer could have both a hydrophobic moiety and an amine moiety, as originally claimed. And since the backbone polymer having both a hydrophobic moiety and an amine moiety has support in the present claim 7. Arfaei discloses backbone polymer based on polyoxypropylene homopolymer or oxypropylene/oxyethylene copolymer having amino functional groups. The backbone polymer in Arfaei has both a hydrophobic moiety and an amine moiety. A grafted side chain polymer is dimethylaminoethyl methacrylate, column 4, line 17. The graft copolymer in Arfaei is readable in applicants' claims 1, 7, 10, 15, 16.

The difference between the present claims and Arfaei is the requirement in the present claim 1 of the selected backbone polymer under Markush group. There is no specific argument in applicants' remarks that Arfaei fails to disclose the applicants' claimed graft polymer. It would have been obvious to one of ordinary skill in the art to use a graft copolymer in Arfaei such that the backbone and grafted side chain have both a hydrophobic moiety and an amine moiety and the ratio of the said amine to said hydrophobe can be selected as specified in the

present claims 10-12 because the selected ratio is depending on the desired properties of the obtained graft copolymer.

The new search has been made for a backbone polymer selected from the groups cited under Markush practice in the currently amended claim 1.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 1, 7-13 and 15-20 as being unpatentable over Arfaei.

Arfaei teaches hydraulic cement additives and hydraulic cement compositions containing the same. Graft copolymers are used as water reducing admixtures and super plasticizers for hydraulic cement concretes, mortars, grouts and the like (col. 1, lines 23-47). These graft copolymer plasticizers have a polyether backbone with side chain polymers attached thereto, which are formed by polymerization of ethylenically unsaturated monomers (col. 1, lines 55-58). The polyether is any homopolymer or copolymer capable of undergoing grafting with ethylenically unsaturated monomers and has repeating units $-(O-R)-$ containing the C-O ether linkage (col. 2, lines 12-17). R is an organic moiety containing a carbon atom linked to the oxygen through a single covalent bond (col. 2, lines 17-19). The polyethers can include reactive groups such as amino, carboxyl or hydroxyl groups, or their derivatives (col. 2, lines 52-57).

The polyether backbone can be relatively hydrophobic (col. 3, lines 17-18). In such instance, the side chains are more hydrophilic than the polyether backbone, and preferably contain salt forming groups (col. 3, lines 22-26). These salt forming groups can be provided by homopolymerizing or copolymerizing ethylenically unsaturated monomers such as acrylic acid, methacrylic acid, or 2-sulfoethylmethacrylate, or provided by monomers containing a quarternary ammonium group or an amine group which can be quarternized after polymerization (col. 3, lines 26-40). Useful ethylenically unsaturated monomers also include acid esters such as methyl acrylate, acid amides such as methacrylamide, vinyl esters such as vinyl acetate, and cationic quaternary ammonium monomers such as quarternized aminoalkyl acrylates and methacrylates (col. 2, line 51 – col. 3, line 24).

In contrast to Arfaei, the hydrophobic backbone of the present invention is either a natural polymer, a linear hydrocarbon, a branched hydrocarbon or a non-polymeric surfactant. The hydrophobic backbone of the present invention is not a polyether, as taught by Arfaei. In particular, Arfaei does not teach or suggest a hydrophobic backbone that is a non-polymeric surfactant. Accordingly, as Arfaei does not teach or suggest each and every element of the

presently claimed invention, and as Arfaei does not provide one skilled in the art the motivation to use the hydrophobic backbone of the present invention, Arfaei cannot be said to render the presently claimed invention obvious.

It is believed that these remarks overcome the Examiner's rejection of claims 1, 7-13 and 15-20 as being unpatentable over Arfaei under 35 U.S.C. § 103(a). Withdrawal of this rejection is therefore respectfully requested.

Reply to the Rejection of Claims 1, 7-13 and 15-20 under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1, 7-13 and 15-20 as being unpatentable over U.S. Patent No. 6,262,152 to Fryd *et al.* ("Fryd"). Specifically, the Examiner states –

Fryd discloses a polymer dispersant having a hydrophobic and hydrophilic moieties, column 4, lines 48-49, 60-67 and column 4, lines 45-67. The resulting graft copolymer can have hydrophobic backbone moiety such as ethylhexyl acrylate/hydroxyethyl acrylate and grafted dimethylaminoethyl methacrylate, column 10, example 3 and column 11, lines 38-40. The composition can be used as a dispersant for the organic particles or inorganic particles, column 3, lines 1-5. The biologically active ingredients or pharmaceutically active compounds can be present, for the present claims 17-18. The dispersions can include the substance to neutralize the monomers to make them soluble. The solubility of the obtained polymer is controlling by the specific selected substances and the ration of the selected hydrophilic/hydrophobic moieties, column 5, lines 10-46. It would have been obvious to one of ordinary skill in the art to select the monomers for the formulation a backbone polymer in Fryd's invention such that the selected monomers would be within the scope of the broad limitations of the monomers int the present claim 1, and, thereby, obtain the claimed requirement.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 1, 7-13 and 15-20 as being unpatentable over Fryd.

Fryd teaches a dispersion in which particles are entangled in a crosslinked polymer matrix (col. 1, lines 11-12). The polymeric dispersant includes graft copolymers having an insoluble (hydrophobic) backbone and soluble (hydrophilic) arms (col. 3, lines 46-54). Useful hydrophobic monomers include acrylates or methacrylates, vinyl aromatic monomers, and aliphatic hydrocarbon monomers (col. 4, lines 45-59). Useful hydrophilic monomers include acid monomers such as acrylic acid and amine-containing monomers such as methacrylate (col. 4, line 60 – col. 5, line 10). Still, Fryd does not teach or suggest the hydrophobic backbone of the present invention. Further, Fryd provides no teaching with respect to the graft copolymer being

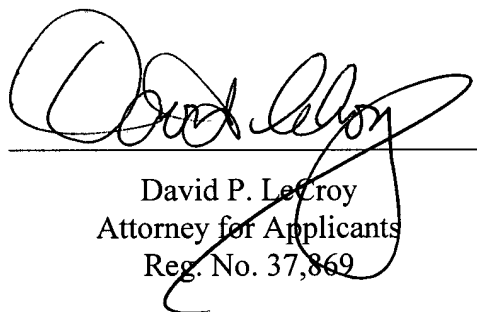
pH triggerable. Accordingly, Fryd does not teach or suggest each and every element, nor does Fryd provide one skilled in the art with the motivation to create a graft copolymer that is pH triggerable, Fryd cannot be said to render the presently claimed invention obvious.

It is believed that these remarks overcome the Examiner's rejection of claims 1, 7-13 and 15-20 as being unpatentable over Fryd under 35 U.S.C. § 103(a). Withdrawal of this rejection is therefore respectfully requested.

It is believed that the above amendments and remarks overcome the Examiner's rejection of claim 1 as being indefinite under 35 U.S.C. § 112, second paragraph and claims 1, 7-13 and 15-20 as being unpatentable under 35 U.S.C. § 103(a). Withdrawal of the rejections is therefore respectfully requested. Allowance of the claims is believed to be in order, and such allowance is respectfully requested.

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